Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications
(CS)

Solid state physics

Course Specifications

Institution Date

College/Department

A. Course Identification and General Information

1. Course title and code: Solid physics - PHY 401

2. Credit hours 42hours (3hours/week)

3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
- Undergraduate in physics field.
- Master in solid state

4. Name of faculty member responsible for the course:
A specific team from the Physics Department

5. Level/year at which this course is offered: Eighth level

6. Pre-requisites for this course (if any):Phys 310

7. Co-requisites for this course (if any): None

8. Location if not on main campus: Visual studios

9. Mode of Instruction (mark all that apply)

a. Traditional classroom	✓	What percentage?	80%
b. Blended (traditional and online)		What percentage?	
c. e-learning	✓	What percentage?	10%
d. Correspondence	✓	What percentage?	10%
f. Other		What percentage?	

B Objectives

1. What is the main purpose for this course?

- Rehabilitation the students in terms of scientific and applied to understand the semiconductors; its kinds, characteristics and some of their applications in solar cells, and others, as well as knowledge of superconducting materials and its properties and some of their uses.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- In the field of the topics taught nationally and internationally to modify and update course by basis and continuously research in the internet and approved books

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:		
1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Semiconductors	4	12
optical and electrical characteristics of semiconductor	4	12
semiconductor growth	1	3 theoretical
Superconducting materials.	2	6 theoretical
Semiconductors	4	12

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	36 hours			12 hours		48 hours
Credit	3					

3. Additional private study/learning hours expected for students per week. None

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment

methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code	NQF Learning Domains	Course Teaching	Course Assessment
1.0	**Knowledge**		
1.1	The student knows the concept of the semiconductor, its types and its characteristics.	Explain the scientific principle upon which the analysis and related applications and then the work on the design and implementation of some of them in practice.	- Quiz - Two midterm exams - Final exam
1.2	The student knows the doping effect in the physical properties of intrinsic semiconductor.		
1.3	The student knows the manufacture of		
1.4	The student knows the superconductor and its remarkable properties compared to		
2.0	**Cognitive Skills**		
2.1	Differentiate between insulator, semiconductor, conductor and superconductor materials	- Lecture - Open discussion - Group Assignments - Internet search	- Quiz - Two midterm exams - Final exam
2.2	Calculate different physical parameters such as, electrical charge density, gap energy,		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate effectively from different sources such as, lecture textbooks, websites and scientific literatures.	- Lecture - Open discussion - Engage students in carrying out internet search. Group assignments	- Presentation - Two midterm exams - Final practical exam
3.2	Responsible for their own learning and continuing personal and professional development.		
3.3	Modify time management skills		
3.4	Work independently and as part of a team.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Research for scientific literature relevant to specific topics which are in relationship.	- Lecture - Open discussion - Training on numerical skills and data presentation.	- Two midterm exams. - Presentation. - Final practical exam.
4.2	Use IT and communication technology in gathering and interpreting information and ideas.		
4.3	Calculate different physical parameters and compare them with those published.		
5.0	**Psychomotor**		

5.1	Write, illustrate and interpret the theoretical data.	Engage student in analysis and	Presentation Mid Term exams Final practical exam
5.2	Construct and design a plan for the theoretical study.	Training on methods of	

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top)

Course LOs #	**Program Learning Outcomes (Use Program LO Code #s provided in the Program**				
		1.1	**1.2**	**1.3**	**1.4**
1.	Semiconductor	band gap energy in solid matters	Conductors, insulator and intrinsic	Doped semiconductor	Fermi distribution and charge density.
2.	Optical properties	Absorption coefficient	Diode photoelectric	Photovoltaic cells	
3.	Manufacture of silicon in	Crystal growth	Czochralski method	Wafer Slicing Process	
4.	Superconductor	Definition and properties	Maxwell and Landau	Surface current and pressure.	

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination,	Week Due	Proportion of Total
1	Midterm 1	6th week	20
2	Midterm 2	10th week	20
3	research work	During the semester	10
4	Final exam	End of semester	50

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

E Learning Resources

1. List Required Textbooks

- Introduction to Solid States; C. Kittel, 7th Edition, John-Wiley and Sons Inc., 1997.

- Myers H.P., Introductory Solid State Physics, CRC Pr I Llc, 1997.

2. List Essential References Materials (Journals, Reports, etc.)
- The physics of Solids: Richard Turton, Oxford.

- John R. Hook & Henry Edgar Hall. Solid State Physics (The Manchester Physics Series); John Wiley and Sons Ltd; 2Rev Ed edition (31 Jan 1995).

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
http://jpkc.fudan.edu.cn/picture/article/255/f4/e7/9f22924c409c960ed6a8ab494c9b/3451913a-0a5d-4650- b12d-14a768ee9164.pdf

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://www.facebook.com/pages/Semi-conducteur/106176309412906?fref=ts&rf=112019005481644

5. Other learning material such as computer-based programs/CD, professional standards or
regulations and software.

- Semiconductor material and devices by H.L. Kwok.
- http://jpkc.fudan.edu.cn/picture/article/255/f4/e7/9f22924c409c960ed6a8ab494c9b/3451913a-0a5d

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
- The number of student dos not exceeds 20 students by classroom of 20m2 surface.
- Students must regularly attend a lab section.
- Lab experiments will be done in pairs. Each person should turn in his/her individual assignments.

2. Computing resources (AV, data show, Smart Board, software, etc.)
Software: Advanced chemical and material structure
modiling, http://www.crystalmaker.com/crystalmaker/
index.html

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
Computer laboratories each for groups of 25 students.

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
- Student questionnaires to be assessed by independent body.
- Assessment of course teaching strategies by independent body

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
- Student questionnaires to be assessed by department.

3. Processes for Improvement of Teaching
- Revision of course contents, course specifications, and strategies every 5 years

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution).
- Check marking by an independent member of staff of a sample of student work.
- Periodic exchange and remarking of a sample of assignments with a member of staff in another institution

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement

- Revision of course contents, course specifications, and strategies every 5 years.